

Serial No. 09/818,324
Art Unit: 1734

Rutan Ref. No. 100664.66506US1
Client Ref. No. 30-5009 (4960)

25. (Added) The method of claim 13 wherein the base layer comprises a thermoset intermixed with a particle filler.
26. (Added) The method of claim 25 wherein the particle filler is thermally conductive.
27. (Added) The method of claim 25 wherein the particle filler is electrically non-conductive.

REMARKS

ELECTION REQUIREMENT

The Applicant confirms at this time the provisional election made by Robert Fish on February 13, 2002, and will pursue the canceled claims in a divisional application to be later filed.

CLAIM OBJECTIONS

The Examiner objects to claim 19 as containing an informality. The Applicant herein cancels claim 19, thus rendering the objection moot.

CLAIM REJECTIONS

Claims 13-21 are rejected as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The Applicant disagrees, but nevertheless amends claim 13 to read the "base layer".

35 USC §103

Claims 13-21 (now 13-15 and 22-27) are rejected under 35 USC 103(a) as being unpatentable over Calhoun et al. (US Patent 5,275,856) in view of Chung (US Patent 6,399,178). The Applicant respectfully disagrees.

Claim 13 recites “a method for coupling an IC to a supporting surface comprising: a) providing an IC; b) providing a supporting surface to which the IC is to be mechanically and electrically bonded; c) providing a pre-form assembly comprising a base layer and a sacrificial layer, **the base layer comprising wire or solder paste through conductors, or the base layer comprising a fiber mesh material impregnated with a thermoset**; d) applying the pre-form assembly to either the IC or supporting surface; e) peeling away the sacrificial layer; f) sandwiching the base layer between the IC and the supporting surface; and g) curing the base layer.”

Calhoun et al. (Calhoun) teaches electrically conductive adhesive tapes comprising at least one carrier web having a low-adhesion face bearing thereon an adhesive layer having substantially uniform thickness, said tape having a plurality of perforations, each perforation containing a plurality of electrically conductive particles in contact with the adhesive layer. Column 3, lines 38-46 further describe the electrically conductive particles as “silver or nickel, metal-coated polymeric particles and graphite”. It is clearly shown in column 3 that the particles are not bound together into a solder paste or are made into a wire, since Calhoun merely mentions using organic binders and clearly does not contemplate a solder paste material. Conventional solder paste formulations comprise a metal or alloy powder, a rosin compound, a rheological additive, a solvent or solvent mixture, a surfactant or surfactant mixture, and/or a buffer or neutralizing agent. One solder paste formulation manufactured by Flip Chip consists of a Tin/Silver/Copper alloy powder, refined gum rosin, 1-phenoxy-2-propanol, Thixatrol ST™, Igepal™ CO-430, 2,2,2-nitrilotriethanol and succinic acid. This solder paste formulation is based on a lead free platform with an organic system that serves as a carrier to produce the paste form of the solder. Calhoun clearly does not contemplate this type of a solder paste system when he describes the use of mere organic binder materials.

Chung teaches an electronic device that comprises one or more electronic components, including flip-chip semiconductor devices, chip resistors, capacitors and inductors by using an adhesive underfill bonding between the electronic component and the substrate. However, the rigid adhesive underfill does not have a sacrificial layer with a release coating, as currently recited in claim 13 of the present application.

The Federal Circuit has stated that “obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching, suggestion or

incentive supporting the combination.” *In re Geiger*, 815 F.2d 686, 2 USPQ 2d 1276, 1278 (Fed. Cir. 1987). In addition, the Court in *W.L. Gore* stated that “In concluding that obviousness was established by the teachings in various pairs of references, the district court lost sight of the principle that there must have been something present in those teachings to suggest to one skilled in the art that the claimed invention before the court would have been obvious.” *See W.L. Gore & Assocs. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303, 311 (Fed. Cir. 1983). Further, the Federal Circuit has stated that “It is impermissible to use the claimed invention as an instruction manual or “template” to piece together the teachings of the prior art so that the claimed invention is rendered obvious. This court has previously stated that ‘one cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention.’” *In re Fritch*, 972 F.2d 1260, 23 USPQ 2d 1780, 1784 (Fed. Cir. 1992) (quoting *In re Fine*, 837 F.2d 1071, 1075, 5 USPQ 2d 1596, 1600 (Fed. Cir. 1988)). A reference teaches away from the claimed subject matter if it suggests that the line of development flowing from the reference’s disclosure is unlikely to be productive of the result sought by the Applicant. *See W.L. Gore & Assocs. v. Garlock, Inc.*, 721 F.2d 1540, 1550-51, 220 USPQ 303, 311 (Fed. Cir. 1983), *cert. denied*, 469 US 851 (1984) and *In re Caldwell*, 319 F.2d 254, 256, 138 USPQ 243, 245 (CCPA 1963) (reference teaches away if it leaves the impression that the product would not have the property sought by the applicant).

There is no motivation, reason or suggestion to one of ordinary skill in the art of preform assembly and integrated circuit production to combine the Calhoun and Chung references to produce a pre-form assembly that comprises a base layer and a sacrificial layer, wherein the base layer comprises wire or solder paste through conductors or a fiber mesh material impregnated with a thermoset that can later have through conductors inserted. The fact that both references are being combined in this instance, without motivation or suggestion in Chung that a sacrificial layer is needed or even desirable, is considered hindsight on the part of the Examiner, and as explained in the previous paragraph, is considered an improper combination. Therefore, it is improper to combine Calhoun and Chung to preclude patentability of independent claim 13. Also, claims 14-15 and 22-27 are patentable over Calhoun and Chung by virtue of their dependency on independent claim 13.

Claims 13 and 16-21 (now canceled) are rejected under 35 USC 103(a) as being unpatentable over Tsukagoshi et al. (US Patent 4,740,657). The Applicant respectfully disagrees.

Claim 13 recites “a method for coupling an IC to a supporting surface comprising: a) providing an IC; b) providing a supporting surface to which the IC is to be mechanically and electrically bonded; c) providing a pre-form assembly comprising a base layer and a sacrificial layer, **the base layer comprising wire or solder paste through conductors, or the base layer comprising a fiber mesh material impregnated with a thermoset**; d) applying the pre-form assembly to either the IC or supporting surface; e) peeling away the sacrificial layer; f) sandwiching the base layer between the IC and the supporting surface; and g) curing the base layer.”

Tsukagoshi teaches connection of conductors by using an adhesive composition or film capable of exhibiting anisotropic-electroconductivity comprising electroconductive particles comprising polymeric core materials coated with thin metal layers and electrically insulating adhesive components. The materials of Tsukagoshi do not comprise a base layer that comprises wire or solder paste through conductors. Furthermore, Tsukagoshi does not suggest, teach or motivate one to prepare a base layer comprising wire or solder paste through conductors, since Tsukagoshi teaches polymeric core materials coated with thin metal layers and adhesive components that cannot possibly be construed as solder paste materials or components. As mentioned earlier, conventional solder paste formulations comprise a metal or alloy powder, a rosin compound, a rheological additive, a solvent or solvent mixture, a surfactant or surfactant mixture, and/or a buffer or neutralizing agent. One solder paste formulation manufactured by Flip Chip consists of a Tin/Silver/Copper alloy powder, refined gum rosin, 1-phenoxy-2-propanol, Thixatrol ST™, Igepal™ CO-430, 2,2,2-nitrioltriethanol and succinic acid. This solder paste formulation is based on a lead free platform with an organic system that serves as a carrier to produce the paste form of the solder. Tsukagoshi clearly does not contemplate this type of a solder paste system when he describes the use of mere adhesive materials. Therefore, based on the arguments presented above, among others, claim 13 of the present application is allowable as being patentable over Tsukagoshi.

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REQUEST FOR ALLOWANCE


Claims 13-15 and 22-27 are pending in this application. The applicant requests allowance of all pending claims.

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Respectfully submitted,

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MARKED UP VERSION SHOWING AMENDMENTS/CHANGES

IN THE CLAIMS

13. (Amended) A method for coupling an IC to a supporting surface comprising:
- providing an IC;
 - providing a supporting surface to which the IC is to be mechanically and electrically bonded;
 - providing a pre-form assembly comprising a base layer and a sacrificial layer, the base layer comprising wire or solder paste through conductors, or the base layer comprising a fiber mesh material impregnated with a thermoset;
 - applying the pre-form assembly to either the IC or supporting surface;
 - peeling away the sacrificial layer;
 - sandwiching the [peeled pre-form assembly] base layer between the IC and the supporting surface; and
 - curing the base layer.
14. The method of claim 13 wherein providing the preform assembly comprises:
- providing a sacrificial layer;
 - coating the sacrificial later with a release coating;
 - applying a thermosetting material on top of the release coating;
 - curing the thermosetting material to form a B-stage layer; and
 - inserting through conductors into the thermosetting material.
15. The method of claim 14 wherein the step of inserting through conductors into the thermosetting material comprises either piercing wires into the thermosetting material, or lasing or drilling and subsequently filling holes in the thermosetting material with a solder paste.

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16. Cancel.
17. Cancel.
18. Cancel.
19. Cancel.
20. Cancel.
21. Cancel.
22. (Added) The method of claim 14 wherein the release coating at least partially comprises silicon, Teflon[®], or graphite release agents.
23. (Added) The method of claim 13 wherein the base layer comprises a fine mesh fiber material impregnated with a thermoset, and the fine mesh fiber is thermally conductive.
24. (Added) The method of claim 13 wherein the base layer comprises a fine mesh fiber material impregnated with a thermoset and the fine mesh fiber is electrically non-conductive.
25. (Added) The method of claim 13 wherein the base layer comprises a thermoset intermixed with a particle filler.
26. (Added) The method of claim 25 wherein the particle filler is thermally conductive.
27. (Added) The method of claim 25 wherein the particle filler is electrically non-conductive.